

CHAPTER 1  
GENERAL

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CHAPTER 1  
GENERAL

## 1. GENERAL.

## a. Purpose. The purpose of these Technical Instructions (TI) is to:

(1) Establish current and uniform criteria and standards to enable quality, cost-effective, productive, and energy-efficient buildings and facilities that meet the needs and expectations of their users.

(2) Direct designers to applicable reference materials to be used for developing projects.

(3) Furnish needed and up-to-date space criteria for most of the buildings planned for future Army construction.

(4) Promote standardization of buildings and facilities world-wide in the Army, including host nation construction programs.

(5) Implement a system for managing criteria information.

## b. Applicability.

(1) This document applies to the design development and project management of buildings and facilities for CONUS and OCONUS Army installations, except medical facilities, and buildings and facilities executed for other military services and work-for-others customers, where appropriate. This includes new construction in the MILCON Program, Host nation funded construction in OCONUS locations, minor construction and non-appropriated fund projects, major alterations to existing structures for the purpose of rehabilitation or conversion into permanent facilities, and certain nonpermanent construction, as indicated.

(2) This document does not apply to Army health facilities. Criteria for these types of facilities are provided in the AEI, Medical Design Standards (reference 1-1).

(3) For projects in overseas locations, host nation building codes, regulations, and international agreement requirements will apply when more stringent than the criteria and standards contained in this document.

(4) Improvement of existing facilities for the sole purpose of meeting these criteria is not authorized.

(5) The Department of Defense (DoD) Directives, Instructions, and other publications, standards, and technical data referenced in this document form a part of these criteria to the extent required by the references thereto.

c. Organization of this Document. This document includes technical criteria and policy for design and construction. General criteria applicable to all facilities are given in chapters 1 through 4 and 6 through 15 covering the basic architectural and engineering disciplines. Specific criteria are given in chapter 5 and the appendices covering space allowances and related requirements for many of the facilities required at Army installations.

d. Design Agency and Using Service. The term "design agency" used in this document means a U.S. Army Corps of Engineers (USACE) command having military design and construction responsibilities. The term "using service" means a military unit (company, battalion, brigade, or headquarters unit) or other organization (club, commissary, or exchange service) that is, or will be, the user of a particular building or facility.

e. DoD 4270.1-M, Construction Criteria. The current edition of DoD 4270.1-M, entitled: Department of Defense Policy Guidelines for Installation Planning, Design, Construction and Upkeep, is dated September 1987 and supersedes all previous editions. This edition, published by the Office of the Deputy Assistant Secretary of Defense (Installations), contains no technical criteria and is not authorized for Army use. Therefore, all references to DoD 4270.1-M should be deleted from USACE technical and contract documents. Likewise, DoD 4270.1-M (any edition) should no longer be used as a source for technical design criteria. However, DD Forms 1391 for Army projects will state that the project scope and design criteria comply with DoD 4270.1-M in effect 1 January 1987, as implemented in the TI, Design Criteria (current version).

f. MIL-HDBK-1190, Facility Planning and Design Guide. MIL-HDBK-1190, dated 1 September 1987, was developed primarily at the request of the US Navy for their use. The proponent for the military handbook is the Naval Facilities Engineering Command. The Army Secretariat has not authorized the use of this military handbook within the Army; therefore, it will not be used as a source for technical design criteria.

g. Construction Criteria Base (CCB). CCB contains Army, Navy, National Aeronautical Space Administration (NASA), Veterans Administration (VA), and other agency guide specifications and criteria documents, along with many industry and government standards. CCB is available at Internet site <http://www.nibs.org/ccb/> and on compact disk-read only memory (CD-ROM) media by subscription from the National Institute of Building Sciences (NIBS) who updates the system on a quarterly basis. CCB subscriptions are currently free of charge to DoD staff and contractors and may be obtained from NIBS by calling (202) 289-7800.

h. TECHINFO. TECHINFO is an Internet-based criteria distribution and feedback system maintained for HQUSACE (CEMP-ET) by the Huntsville Engineering and Support Center and provides access to Corps of Engineers Guide Specifications (CEGS), policy and criteria documents, Engineering Improvement Recommendation System (EIRS) Bulletins, SPECSINTACT software, the CADD Library of Standard Designs, and other related information of interest to specification writers and design staff. The web address for TECHINFO is <http://www.hnd.usace.army.mil/techinfo/index.htm>. As this system is updated as new documents and changes are approved (compared to quarterly updates for CCB), the latest criteria will always be on TECHINFO.

i. SPECSINTACT. SPECSINTACT is an automated specification system that is mandated by ER 1110-345-700 (reference 1-2) for producing and maintaining master guide specifications and for developing project specifications. The system incorporates numerous quality assurance (QA) features and reduces engineering hours spent in developing technical, testing, submittal, and execution requirements for construction contracts. The SPECSINTACT Internet site <http://si.ksc.nasa.gov/specsintact> is maintained by the Kennedy Space Center (KSC) for user feedback and access to the latest software releases, software release notes, the *User Guide*, and lessons learned. SPECSINTACT is also available from CCB and TECHINFO. Dedicated user support for this system is available by calling KSC at (407) 867-8800.

j. CADD Library of Standard Designs. The CADD Library is an Internet-based system maintained for HQUSACE (CEMP-EE) by the Tri-Service CADD/GIS Technology Center at CEWES and contains CADD drawings for the DA Facilities Standardization Program, other standard designs, selected completed USACE project designs, and standard details and symbols. All drawing files are available for viewing and downloading at Internet site <http://cadlib.wes.army.mil/>.

## 2. FACILITY DESIGN.

a. Policies, Responsibilities, and Procedures. The design of all Army facilities will be accomplished in accordance with the policies, responsibilities, and procedures outlined in ER 1110-345-100 (reference 1-3) and with applicable criteria identified herein, Federal Acquisition Regulations, Army and Engineer regulations, technical letters, manuals and standards, memorandums issued by HQUSACE, standard designs, design guides, guide

specifications, and other specific or special design directives and instructions.

b. Design Requirements. The design of Army facilities will:

- (1) Be based on the actual requirements of the project.
- (2) Where applicable, be based on DA standard design packages developed under the DA Facilities Standardization Program (reference 1-4).
- (3) Meet the operating requirements of the using service and provide reasonable flexibility to accommodate foreseeable changes in requirements by the using service.
- (4) Provide an aesthetic, comfortable, productive, and healthy working and/or living environment for the user and facility occupants.
- (5) Provide highly functional facilities at the lowest practicable construction and acquisition costs consistent with energy efficient operation and total life-cycle economy.
- (6) Be appropriate for the type or importance of the facility and the local surroundings and meet the necessary environmental requirements, including applicable Federal, state, and local pollution control criteria and standards.
- (7) Include the latest, most technologically advanced products, equipment, systems, and installations with the highest efficiencies possible that are environmentally correct and life-cycle cost (LCC) effective.
- (8) Include products, equipment, systems, and installations that meet the needs of the customer in terms of maintainability and future expansion.
- (9) Include the use of innovative contracting methods, such as design-build, performance, and indefinite delivery type (IDT) contracting, to the maximum extent practical and cost effective.

c. Design Analysis. A design analysis (basis for design) will accompany project drawings and is required for all new Army construction projects and Army projects involving alteration or expansion of existing facilities unless otherwise specifically exempted. Design analyses will be developed in accordance with ER 1110-345-700 (reference 1-2) and will identify and validate decisions made during a project's design to determine the optimum combination of effective facility design, economical cost, and minimal adverse environmental impact.

(1) Design Features. Design analyses will include, but not be limited to, studies of those design features of facilities that most contribute to functional efficiency, flexibility in long-term use, construction quality, energy efficiency, environmental impact, and life-cycle cost, such as:

- (a) Orientation and siting.
- (b) Pavements and exterior utility systems.
- (c) Architectural features, including building configuration, functional layout, column spacing, story heights, and exterior and interior finishes.
- (d) Structural systems.

- (e) Fuel source selections and distribution systems.
- (f) Air-conditioning and heating systems.
- (g) Plumbing systems.
- (h) Electrical systems.

(2) Life-cycle Costs. Design decisions for all types of construction projects will be based on life-cycle cost considerations to determine an economical cost for facilities, taking into account not only initial construction costs but also the operating and maintenance costs of buildings--and the associated impacts on the missions performed within them--over their anticipated life.

d. Value Engineering. Value Engineering (VE) will be an integral part of the design process and applied in the early phases of design development of each project with a potential savings, regardless of project cost. VE will be initiated in the development of the concept design based on program documents and utilized during the design and construction of projects. VE will be applied in accordance with ER 1110-345-100 (reference 1-3). Changes resulting from VE proposals will in no way violate the mandated minimum energy conservation requirements or the energy budget values defined in chapter 11.

e. Construction Qualities. In no case will the quality of construction be higher than is necessary to provide life-cycle cost effective facilities suitable for the actual needs (including comfort, productivity, and health) of the intended user. For industrial and service facilities, such as shops and storage facilities, an austere quality of construction with reduced finishes will be provided. For buildings of more sophisticated occupancy, such as laboratories and major headquarters buildings, a higher quality of construction with better finishes may be provided. Specific criteria for many individual facilities are stated in this document.

f. Use of Local Construction Methods, Materials, and Skills. Designs will consider economies that can be effected by the use of suitable local construction methods, materials, and skills that are consistent with the intent of these criteria.

g. Use of Standard or Stock Products. Commercially available standard or stock equipment, fixtures, and materials will be used when practicable.

### 3. CONSTRUCTION LEVELS AND BUILDING TYPES.

a. Building Definitions. The definitions provided below are used in this document to describe the levels and types of construction of most Army buildings and related facilities.

(1) Permanent Construction. Buildings and facilities designed and constructed to serve a life expectancy of more than 25 years, to be energy efficient, and to have finishes, materials, and systems that are low maintenance and low life-cycle cost.

(2) Semipermanent Construction. Buildings and facilities designed and constructed to serve a life expectancy of more than five years but less than 25 years, to be energy efficient, and to have finishes, materials, and systems that require a moderate degree of maintenance using the life-cycle cost approach.

(3) Temporary Construction. Buildings and facilities designed and constructed to serve a life expectancy of five years or less using low-cost construction, with finishes, materials, and systems that are selected with maintenance factors being a secondary consideration.

(4) Mobilization and Emergency Construction. Buildings and facilities designed and constructed to serve a specific mobilization or emergency requirement. Buildings will be austere to minimize construction time and maximize conservation of critical materials. Maintenance factors and longevity will be secondary considerations.

(5) Building System and Subsystems. A building system is an assemblage of dimensionally and functionally pre-coordinated subsystems which, when combined, produce an essentially complete and functional building. A subsystem is one of many building components designed and manufactured to be combined and integrated with other types of subsystems to produce an entire building system.

(6) Industrialized Buildings. Buildings in which major components and some subsystems are constructed at a factory, transported to the job site, and erected. An example is factory construction of individual walls with the plumbing and electrical wiring already installed.

(7) Manufactured Buildings. Buildings constructed from whole building modules that are constructed at a factory, transported to the job site, and connected to other modules to form an entire structure. An example is multistory unaccompanied personnel housing in which each living unit is factory constructed with walls, floors, ceilings, plumbing, and electrical wiring.

(8) Pre-Engineered Buildings. Buildings constructed entirely from a manufacturer's system of standard stock items. Pre-engineered buildings often rely on a modular dimension system and can be constructed in a wide range of configurations and sizes.

(9) Relocatable Buildings. Buildings designed to be dismantled to facilitate relocation and normally purchased as equipment to fill a temporary requirement.

(10) Portable Buildings. Buildings designed to be easily moved intact.

b. Criteria for Building Systems Construction.

(1) Standards and Quality. The standards and level of quality indicated in this document apply to industrialized, manufactured, pre-engineered, and other types of building systems construction.

(2) Component Parts. The component parts will be readily available and able to be procured competitively. In other words, it is not intended that designs, or availability of specified or offered component parts, be subject to further research or development, or both, but rather that the component parts be standard and off-the-shelf stock items.

(3) Manufactured and Pre-Engineered Buildings. These types of construction may be used for buildings when such use is indicated by life-cycle cost to be economical; when they will meet the functional and performance requirements of the project; and when they can be architecturally compatible with the environment in which they will be erected. Because of the great variance in the cost and quality of such structures on the market, extreme care must be used in selection to ensure that the quality of the facility to be provided is commensurate with the project requirements and expected longevity of the mission to be served.

(4) Relocatability. Relocatability may be specified only when the project justification certifies that the facility involved is of uncertain or limited tenure and the provisions of this feature will not result in a degradation of proven standards of design, architecture and engineering, or result in increased operating and maintenance costs. When relocatability is the primary design consideration, DoD Instruction 4165.56 (reference 1-5) will apply.

4. OCCUPATIONAL SAFETY AND HEALTH ACT CONSIDERATIONS. The Occupational Safety and Health Act (OSHA) of 1970 (reference 1-6) requires that safety standards issued by the Secretary of Labor be followed in the work place. Section 19 of this Act requires Federal agencies to establish and maintain effective and comprehensive programs consistent with the standards issued by the Secretary of Labor. Those standards issued by the Secretary of Labor that affect the design of buildings are principally found in the General Industry Standards, 20 CFR 1910 (reference 1-7). The design of all Army facilities that serve as places of employment will conform to, or be consistent with, all applicable standards published under the Occupational Safety and Health Act of 1970 (reference 1-6). In the case of an apparent conflict between this document and OSHA Standards, the standard providing the greatest degree of safety will govern.

5. COST REVIEW GUIDE. Cost data to be used in preparing and reviewing the annual military construction programs are contained in the DoD Pricing Guide and Army TM 5-800-4, Programming Cost Estimates for Military Construction (reference 1-8). Tables I (Cost Guide), II (Area Cost Factors), and III (Tri-Service Military Construction Program Index) in TM 5-800-4 are updated annually by HQUSACE (CEMP-EE) with newsletters 3.2.1 and 3.2.2 in the Programming, Administration, and Execution (PAX) System and on the HQUSACE Internet site <http://www.hq.usace.army.mil/cemp/e/es/pax/paxtoc.htm>. The Deputy Under Secretary of Defense (Industrial Affairs and Installations), in coordination with the Military Departments, updates, publishes, and distributes the DoD Pricing Guide.

#### 6. REFERENCES.

- 1-1 Architectural and Engineering Instructions (AEI), Medical Design Standards (current edition)
- 1-2 ER 1110-345-700, Design Analysis, Drawings, and Specifications, 30 May 1997 (or latest edition)
- 1-3 ER 1110-345-100, Design Policy for Military Construction, 15 February 1994 (or latest edition)
- 1-4 ER 1110-3-113, Department of the Army Facilities Standardization Program, 27 September 1993 (or latest edition)
- 1-5 DoD Instruction 4165.56, Relocatable Buildings, April 3, 1981 (or latest edition)
- 1-6 Occupational Safety and Health Act of 1970
- 1-7 General Industry Standards, 20 CFR 1910, Occupational Safety and Health Administration, Department of Labor, 200 Constitution Avenue, N.W., Washington, D.C. 20210
- 1-8 TM 5-800-4, Programming Cost Estimates for Military Construction, May 1994 (or latest edition)